THE VALUE OF PETECHIÆ IN DIAGNOSIS AND PROGNOSIS.

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Every case of doubtful diagnosis should be thoroughly inspected for evidences of hemorrhagic lesions. In the routine examination of a patient, an enlarged spleen, a cardiac murmur, or an abnormal abdominal mass are seldom overlooked; but a subconjunctival hemorrhage or a crop of petechiæ around the knee are just as seldom observed. The finding of a minute petechia on the mucous membrane of the palate or in the conjunctiva will not definitely establish a correct diagnosis, but it will, by eliminating the many conditions in which these hemorrhages are absent and by furnishing a positive sign which we cannot discard, serve as a great aid in the solution of the problem.

The idea in mind in writing this paper is not to compile an exhaustive treatise on the hemorrhagic eruptions, but to mention several unusual cases in which the occurrence of petechiæ afforded a clue to the proper diagnosis or was striking on account of its rarity in these cases. A summary in the beginning, of the common conditions in which we are likely to find petechiæ, should not be irrelevant. They are as follows:

1. Acute Infectious Diseases. Any bacteriemia may develop petechiæ, as pneumonia, bacterial endocarditis, postpartum or post-traumatic sepsis, in which cases the hemorrhages may be embolic in origin. This may be likewise true in cases of pernicious malaria, many of which are accompanied by a petechial eruption; in some of these cases thrombi produced by masses of bacteria have been found in the brain at autopsy. Under the heading of acute infections we may also classify those diseases in which there is not a general systemic infection or at least in which our present laboratory methods are insufficient to establish a bacteriemia, as in yellow fever, most cases of cerebrospinal meningitis, and the acute exanthemas, as scarlet fever, measles, and smallpox.

2. Toxic States not Associated with or Secondary to Bacterial Infectious Agents. In this category as causative factors are:

(*a*) *Drugs:* As quinine, copaiba, belladonna, potassium iodide, alcohol, ergot, chloral, salicylic acid, and benzine vapor.

(*b*) *Urinary Sepsis:* In uremia or after operative procedures upon the urinary tract, where the patient is overpowered by the toxins due to a suppression or retention of urine, petechiæ are not uncommon.

(*c*) *Snake-bite.*

(*d*) *Jaundice.*

In the latter two conditions there is often a general hemorrhagic tendency evidenced not only by purpura, but in many instances by extensive subcutaneous extravasations.

3. BLOOD DISEASES. Practically all the blood diseases may show at some time a more or less extensive petechial eruption, as leukemia, pernicious anemia, etc. Under this heading, or under that of the acute infectious diseases, we may classify the simple and the so-called "rheumatic" purpuras, the Henoch's and Schönlein's type, and the "erythema group" of Osler's, in which hemorrhagic lesions are characteristic.

4. CONDITIONS PRODUCED BY MECHANICAL CAUSES. Sudden changes of atmospheric pressure, as in caisson disease, or paroxysms of coughing, as in pertussis, or convulsions of any kind, are likely to be associated with hemorrhages.

5. EXHAUSTIVE STATES. Carcinoma, tuberculosis, Hodgkin's disease, and other wasting illnesses in their last stages are known to produce petechial and other hemorrhagic lesions.

6. NERVOUS DISEASES. Both organic diseases, as myelitis and tabes dorsalis, and functional conditions, as hysteria, are occasionally associated with skin hemorrhages.

Petechiæ in bacterial endocarditis, in Henoch's purpura in epidemic cerebrospinal meningitis, and in the bacteriemias of pyogenic origin are not uncommon. I shall take occasion, therefore, to cite only unusual cases, which I observed recently while in charge of the admitting department of the Mt. Sinai Hospital, in which petechiæ played an important part in the diagnosis.

CASE I.—*History of erysipelas followed in two weeks by high fever and prostration; petechiæ in conjunctiva; diagnosis of streptococcemia made; Bacillus typhosus in blood culture.*

C. Z., aged thirty-six years. (Service of Dr. Rudisch.) The past history was negative. There were no infectious diseases. Four weeks before admission the patient had been treated for erysipelas of the leg, which had run a mild course, and had apparently been cured in about a week. For the two weeks prior to admission there had been gradually increasing headache, fever, malaise, and shortness of breath. On admission the patient appeared mildly prostrated. Evidences of the former erysipelas had entirely disappeared. The temperature was 103° and the pulse 110. In the left lower conjunctiva were three distinct petechiæ, in the right, one. The remainder of the physical examination was negative. The spleen was not felt; the pulse was not dicrotic; there was no eruption. The diagnosis of bacteriemia secondary to the previous erysipelas was made. The day after admission fresh petechiæ were found in both conjunctivæ. The blood-count showed a slight leukocytosis, with 66 per cent. of polynuclear leukocytes, 33 per cent. of lymphocytes, and 1 per cent. of transitionals. The temperature ranged between 103° and 105°. Four days after admission the spleen became palpable. The blood-culture taken the day of admission was reported positive, not for the Streptococcus pyogenes or staphylococcus, as was expected, but for the Bacillus typhosus. The patient became more and more prostrated. Several days after admission there were evidences of intestinal hemorrhage; a week later perforation of the bowel occurred, resulting in death, despite the early diagnosis and immediate operation.

A search of the literature fails to show many cases of typhoid fever with petechiæ on record. In fact, the one distinguishing sign which differentiated typhoid and typhus fever in the days when the latter disease flourished was the presence of petechiæ in typhus. This must be considered, therefore, as a rather unusual case.

CASE II.—*Acute onset with fever, vomiting, and convulsions, in a child; signs of meningitis; skin petechiæ; no meningococci in spinal fluid; recovery; acute polioencephalitis.*

J. B., aged five years. (Service of Dr. Koplik.) The child had been well up to four days prior to admission, at which time the patient had become acutely ill with fever and headache. He had vomited once at the onset. Just before the child was brought to the hospital he had had a general convulsion lasting ten minutes. Physical examination revealed a condition of semistupor, a temperature of 104°, a slight Macewen sign, a tâche cérébrale, a Babinski reflex on the right side, and a Brudzinski sign. On the skin over the right deltoid were five or six small but definite, apparently recent, petechiæ. There was no rigidity of the neck; there were no palsies. The diagnosis of epidemic cerebrospinal meningitis was made. The next day the following data were obtained: Blood-count, 18,200 white blood cells, with 85 per cent. polynuclear leukocytes and 15 per cent. lymphocytes. On lumbar puncture, 12 c.c. of clear fluid under pressure was obtained, the cytology of which was later reported to be 100 per cent. lymphocytes. No tubercle bacilli were found. Four days afterward a facial palsy became apparent, and the next day decided weakness of the right leg. The stupor was somewhat less marked, but the other signs of meningitis seemed to be on the increase. Within twenty-four hours, however, the symptoms abated, the palsies lessened, the petechiæ disappeared, and the patient steadily improved until his discharge three weeks later, at which time he had fully recovered.

That polioencephalitis and meningitis are not easily distinguishable in many cases is a matter of common knowledge. It is, therefore, rather unfortunate for the science of diagnosis that the classical sign of cerebrospinal meningitis, the sign that caused it to be known as spotted fever, and upon which the diagnosis has often been made, should be usurped by another condition so analogous in its manifestations.

CASE III.—*Acute lobar pneumonia; jaundice; pneumococcic sepsis; petechiæ.*

J. B., aged thirty-eight years. (Service of Dr. Manges.) The patient's present illness began six days before entering the hospital, with a chill, fever, and pain in the right side of the chest. Later a slight cough developed. All symptoms increased to the time of admission. The examination on admission revealed signs of a lobar pneumonia on the right side, extending almost to the spine of the scapula. The patient showed evidences of marked prostration. There was a double mitral murmur, but no signs of cardiac decompensation. Jaundice appeared soon afterward and steadily progressed. One week after admission several crops of petechiæ were observed over both shoulders. The blood-culture taken at this time showed the pneumococcus. The patient's general condition became gradually worse, and he died two days later.

In this case, although it is conceivable that the petechiæ may have been dependent upon the jaundice, it is more probable that they were due to the pneumococcemia. Petechiæ in pneumonia, even without a demonstrable bacteriemia, may occur, although these cases are not common. An analogous case, also on the service of Dr. Manges, I reported about six months ago. Here, however, the diagnosis presented some difficulty, from the fact that the petechia was in the conjunctiva and minutely resembled those characteristic of bacterial endocarditis.

CASE IV.—*Emaciation; marked anemia; conjunctival petechiæ; admitting diagnosis: pernicious anemia; blood-count typical of lymphatic leukemia.*

E. S., aged forty-six years. (Service of Dr. Brill.) This patient gave a history of a rather vague onset, two months prior to admission, of epigastric cramps and anorexia. These symptoms continued with, in addition, a steady decline in weight. Excessive thirst was the patient's chief complaint. There was no vomiting, no polyuria, no bleeding from any mucous membrane. On admission the patient looked anemic, and showed evidence of marked emaciation and asthenia. The tongue was extremely dry and rather beefy in its appearance. The liver was enlarged to two fingers below the free border of the ribs. There were no glands or spleen to be felt. The reflexes were somewhat exaggerated. In both lower conjunctivæ there were several small but definite petechiæ. There were three possibilities considered at the time of admission: diabetes, eliminated by the negative result of the urinary examination, malignancy, and a blood disease. The last diagnosis was finally decided upon, and the patient admitted to the wards with the working diagnosis of pernicious anemia, no blood-count, however, having been taken in the admitting department. On the wards the blood-count was shown to be 40,000 white blood cells; small lymphocytes, 54 per cent.; large lymphocytes, 44 per cent.; polynuclear leukocytes, 2 per cent.; and hemoglobin, 42 per cent. Three days afterward petechiæ were seen on both arms. Later, diarrhea and weakness became marked, the skin hemorrhages increased greatly in number, and the patient finally died about three weeks after admission. At no time were there glands or a spleen to be felt.

In this case, although, of course, the petechiæ did not determine the diagnosis, they were, taken together with the anemia, instrumental in limiting the diagnosis to that of a blood disease. The exact type of blood disease was of secondary importance at the original examination. In several other cases of leukemia seen recently the diagnosis was suggested by the presence of skin and subconjunctival petechiæ, enlarged glands, and a palpable spleen having been absent.

CASE V.—*Signs of purpura hemorrhagica; steady progression of symptoms; ulcerations and gangrene; fatal outcome.*

H. A., aged fourteen years. (Service of Dr. Manges.) The past history was negative, with the exception of frequent attacks of tonsillitis. Six weeks before her appearance at the hospital, after exposure, the patient felt chilly, and complained of general aching pains and a soreness and redness of the left eye. These symptoms abated in a few days, but recurred five weeks later, accompanied by pain in the right wrist and knee. The day before admission the swelling of the right wrist and knee became aggravated, and was accompanied by a chill, considerable fever, and the appearance of a moderate number of small red spots in the skin around the swollen joints. On admission the patient looked acutely ill and in severe pain. Both wrists, ankles, and knees were swollen, red, and tender to the touch. Around several of the joints, in the conjunctivæ, and on the abdomen, were petechiæ, some minute, others as large as the head of a pin; on the buttocks were two somewhat larger hemorrhagic areas. The subsequent course of this patient presented a picture never to be forgotten. Daily, almost hourly, fresh hemorrhages occurred on the chest, abdomen, legs, buttocks, and in the mouth. All of these steadily underwent the same transformation. The hemorrhages would increase in size to that of a ten-cent piece or even a quarter, then develop around their periphery an inflammatory red zone, begin to ulcerate, become foul-smelling, gangrenous, and finally slough away. Despite all methods of treatment this process of destruction continued to increase, until just before death one-third of the skin of the body and of the mucous membranes of the mouth, larynx, rectum, and vulva was involved. The patient died three weeks after admission.

This case has been reported on account of its rarity. The simple purpuras, the rheumatic purpuras, and those associated with visceral manifestations usually have an excellent prognosis. It is uncommon to see a case of this description, manifestly rheumatic in etiology, resist all therapeutic measures and terminate fatally.

CASE VI.—*Case of myocarditis and nephritis; Bacillus coli communis pyelitis; petechia in conjunctiva; sudden death.*

G. B., aged forty-nine years. (Service of Dr. Rudisch.) The patient gave the usual history of a cardionephritic case; dyspnea, slight edema of the legs, and cough for many months. Several days before admission the swelling of the legs had increased considerably, and the urine had become scanty. There had been slight fever and occasional sweats; no chills. Examination revealed the clinical signs of myocarditis, with nephritis, dyspnea, pulmonary congestion, weak heart sounds, swollen liver, and edematous legs. Besides this, there was found in the left lower conjunctiva a distinct petechia. The urine showed considerable albumin, pus, red blood cells, and many casts. Culture of a catheterized specimen showed the Bacillus coli communis. The petechia disappeared within forty-eight hours. The patient gradually improved and had been out of bed for several days, when he was suddenly seized with a convulsion, followed by almost immediate death.

Similar cases are not uncommon. One analogous case was seen recently on the service of Dr. Brill, where the lower extremities of a nephritic patient were almost covered with minute petechiæ. It is conceivable that these small hemorrhages may be the result of increased blood-pressure or may be evidences of a toxemia. In favor of the latter theory may be mentioned instances of petechiæ in those cases of so-called urinary sepsis following kidney or prostate operations, where the system is poisoned by an accumulation of toxins unable to be eliminated by the usual channel.

CASE VII.—*History of a debauch; conjunctivitis; numerous petechiæ in upper and lower conjunctivæ.*

A. B., aged twenty-seven years. This patient was seen twelve hours after a night of dissipation. He was unaccustomed to the frequent use of intoxicating liquors. Six months before, a similar debauch was followed by the same symptoms. There was evidence of a mild conjunctivitis. In the upper and lower conjunctivæ of both eyes were seen many petechiæ of varying sizes, not merely dilated bloodvessels, but actual hemorrhages into the tissues. Seventy-two hours elapsed before the absorption of these hemorrhages.

It is interesting to note that the toxic effect of the alcohol in this case was, so far as could be observed, confined to the bloodvessels of the conjunctiva, the vessels of all other mucous membranes and the skin apparently having been spared. In all probability, however, the upper gastro-intestinal tract was likewise studded with minute hemorrhages, the result of the poison upon a delicate membrane; but of this we have no proof.

CASE VIII.—*History suggestive of an acute exacerbation of a chronic nephritis; marked eosinophilia; conjunctival petechiæ; trichiniasis.*

M. R., aged twenty-two years. (Service of Dr. Rudisch.) With the exception of indefinite pains in both loins and occasional urinary disturbances, the past history of this patient had been negative. Three weeks before admission the patient had complained of the symptoms of an influenzal infection; headache, fever, chilly sensations, and general body pains. The fever had subsided after a few days and had not recurred. The urine had been somewhat scanty, the face had become swollen, and the headache had continued. There had been some vomiting. At the time of the original examination the patient appeared to be suffering from nephritis, as evidenced by the puffy face and eyelids and the history of scanty urine, headache, and vomiting. The urine showed a heavy trace of albumin, but no casts. In the lower left conjunctiva were many small petechiæ. Distinct tenderness was elicited over the deltoid muscles and those of the calves. There was no fever. The blood-count was reported to be 12,600 white blood cells, of which there were 62.5 per cent. of polynuclear leukocytes, 19 per cent. of lymphocytes, and 18.5 per cent. of eosinophiles. Subsequent blood examinations revealed the presence of eosinophiles in even larger proportions, the highest count showing 37 per cent. The hemorrhages disappeared within a few days. The stools contained no ova or parasites of any kind. The diagnosis of trichiniasis was made, although the trichinæ were not demonstrated.

Petechiæ in this disease are uncommon, and so could not have been of any great assistance here in determining the diagnosis. This case is interesting, however, and illustrates the wisdom of looking for hemorrhages where trichiniasis is suspected.

CASE IX.—*History of bite by rabid dog; increasing irritability, finally coma and death; skin petechiæ.*

H. S., aged nine years. (Service of Dr. Koplik.) Twenty-six days before admission this patient had been bitten on the face by a dog. The next day both patient and dog were taken to the Pasteur Institute, where the dog was killed and proved to have had rabies. The child had then undergone eighteen treatments at the institute, and had been discharged about ten days before admission to Mt. Sinai Hospital, apparently cured. Three days afterward he had suffered an attack of prolonged vomiting. Since then there had been increasing restlessness, irritability, delirium, and finally, the day before admission, coma. In addition the parents had noticed for two days a peculiar twitching of one side of the mouth for several minutes at a time. There had been no convulsions, no photophobia, no history of the refusal of water. The physical examination revealed a child in coma, absolutely unresponsive, with slight spasticity of the lower extremities, a Macewen sign, and an occasional clonic twitching of one side of the face, especially at the angle of the mouth. Over the chest, the lower abdomen, the shoulders, and in the folds of the elbow were many small but unmistakable petechiæ. There was no neck rigidity, no Kernig, no Babinski sign, no tâche cérébrale. The temperature was 104° On lumbar puncture, 20 c.c. of faintly turbid fluid under slightly increased pressure was obtained. The bacteriology of the fluid was negative; there were no meningococci, no tubercle bacilli. Of the cells seen, 90 per cent. were lymphocytes, 10 per cent. polynuclear leukocytes. The child's condition steadily grew worse, and he died fifteen hours after admission.

In the diagnosis of this case, petechiæ were valueless. Without the previous history of a dog-bite, the diagnosis of rabies, which this in all probability was, though no necropsy was obtainable, would have been impossible, the acute onset, the previous irritability, the coma, and the petechiæ especially, indicating an epidemic cerebrospinal meningitis. This case is reported merely as another example of the occurrence in children of a hemorrhagic eruption in conditions resembling "spotted fever."

CASE X.—*History and signs of acute appendicitis; chills and fever; petechiæ in conjunctivæ; weak heart sounds; diagnosis of bacterial endocarditis with mesenteric embolus; acute gangrenous appendicitis found at operation.*

D. C., aged twenty-nine years. (Service of Dr. Lilienthal.) The history had been negative, with the exception of an attack of somewhat similar nature, although not so severe about four months previous to admission. Five days before admission the patient had complained of headache, mild epigastric pain, and general weakness, had gone to bed, and had apparently improved for two days, when he had suddenly vomited and complained of severe pain in the right iliac region, accompanied by fever and chilly sensations. The last three symptoms had continued to date. There was no history of hematemesis or melena. The physical examination was extremely interesting. The patient looked acutely ill. The temperature was 102°. On account of the abdominal symptoms, the abdomen was first examined. Marked tenderness over the entire right lower quadrant, some rigidity, less tenderness over the remainder of the abdomen, and the suggestion of movable flatness pointed to the diagnosis of appendicitis. In doing the remainder of the physical examination in a routine way, four distinct petechiæ were discovered in the right and three in the left conjunctiva. The heart sounds were found to be extremely weak, but there was no evidence of an endocardial murmur. Despite this, the diagnosis of bacterial endocarditis with a mesenteric embolus was hazarded, the possibility of an acute gangrenous appendicitis, however, having been kept in mind and the surgical indication recognized. The patient was operated upon immediately and a gangrenous appendix with spreading peritonitis found. The patient made an uninterrupted recovery, and was discharged in about two and a half weeks after his operation. The petechiæ disappeared in seventy-two hours after admission.

The etiology of the petechiæ here is a matter of conjecture. That they were manifestations of a bacteriemia secondary to a diseased appendix can hardly be considered, inasmuch as appendicitis is practically never followed by a general systemic infection, pylephlebitis and multiple liver abscesses without a bacteriemia being the usual sequelæ of a fulminating or a neglected case. Infective endocarditis may be eliminated by the disappearance of the petechiæ, the absence of a cardiac murmur, and the speedy recovery of the patient. We must be satisfied with the explanation that although the patient did not appear much prostrated, the toxemia nevertheless must have been sufficiently intense to have produced the conjunctival hemorrhages. A similar case was seen and operated upon several years ago by Dr. Elsberg, by whose kind permission I am citing the case. Here there had been a history, dating back several days, of abdominal pain and gastric distress, together with joint pains and a petechial eruption around the joints. There were petechiæ in the conjunctivæ. It was difficult to decide between a gangrenous appendicitis and "visceral crises of the erythema group." Prompt operation revealed the former condition. Here a culture of the sticky pus around the appendix was taken and reported to contain the proteus vulgaris.

Besides their importance in diagnosis, petechiæ may be considered to have some value in prognosis. In these days, when so much work is being done upon endocarditis accompanied by bacteriemia, one is prone to look with suspicion upon every case of endocarditis with petechiæ. Such a suspicion is justifiable, of course, but one must bear in mind the possibility, as evidenced by the foregoing examples, of other causes of petechiæ; so that what is most important to the patient, the prognosis, should not be definitely stated until bacteriological methods have confirmed the diagnosis. In children under ten years of age I have seen several cases of endocarditis, and one case of endopericarditis, with fever, chills, conjunctival and palatal petechiæ, which were clinically cases of bacterial endocarditis, give a negative blood culture, and so far as their acute symptoms are concerned, become entirely well. In other infectious diseases, as in typhoid fever, pneumonia, and the acute exanthemas, the presence of petechiæ renders the prognosis serious but not necessarily fatal. Where these hemorrhages are present, the case is often a fulminating one. Likewise in chronic nephritis and in other conditions of renal origin, petechiæ indicate extreme toxemia. The few cases reported will serve, I trust, to prove the value of petechiæ in diagnosis and prognosis, and to encourage the physician to hunt for them in the skin, in the mouth, and in both upper and lower conjunctivæ, in any questionable case.